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Carbon Sink Framings in Forestry Debates in Finnish Newspaper Media 2016 – 2019

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Abstract

In this paper, I examine the discussions around the concept of carbon sinks. From those discussion of Finnish forestry, I identify frames based on a media material of 108 news articles combining the methodologies of frame analysis and content analysis. I aim to contextualize the carbon sink discussions of the latter half of 2010s and examine how the natural science-based term is used to support varying policy agendas. Building from background literature on the media as a societal actor and a context around Finnish forest discussions and mismatches between science and forest policy, I reflect on the ways that Finnish media frames and contextualizes carbon sink-related forest discussions. Eventually, I identify three dominant and eight secondary frames that describe the ways of using and the transforming of carbon sink as a term in detail. The dominant frames divide the discussion into two clashing ways to communicate carbon sink issues and a third middle ground way of understanding and using the term. The middle ground frame identifies the conflict between the clashing frames and suggests reaching to an understanding as a priority goal in terms of optimal climate change policy. I discuss the results in terms of the frames' policy implications. In addition, I ask how they signal potential developments in forest and climate policy and discourse. The analysis shows that the clearest disagreements in the carbon sink conflicts raise from how forestry restricting policies are seen to affect carbon sink levels and how prominent a role should forest industry have in meeting national and international climate policy targets. The study confirms that carbon sink as a term transforms into altering forms to support distinct, even controversial policy goals because of both definitional and calculative uncertainties.

Keywords
carbon sink, framing, forest policy, Finland, media, forest discussion

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Tiivistelmä

Tutkin hiilinielujen ympärillä käytävää metsäkeskustelua suomalaisissa sanomalehtimedioissa ja muodostan työn tuloksina hiilinielu-termin käytön ja kehysteorian perusteella kehyksiä 108 uutisartikkelin aineistosta. Tavoitteenani on kontekstualisoida 2010-luvun jälkipuoliskon hiilinielukeskusteluja, tutkia sen toimijoita ja erityisesti sitä, kuinka hiilinielu-termiä käytetään erilaisten politiikka-agendojen tukena. Tutkimuksen konteksti on rakennettu suomalaisen metsäkeskustelun, metsiä koskevien tieteen ja politiikan välisten ristiriitojen sekä median yhteiskunnallisen tarkastelun ympärille. Analyyttisessä viitekehyksessä esittelen kehystämisen teoriaa ja kirjallisuutta näkökulmana empiiriseen analyysiin, jossa yhdistän kehys- ja sisällönanalyysin keinoja. Tunnistan lopulta keskustelusta kolme pääkehystä, jotka jaan kahdeksaksi toissijaiseksi kehykseksi kuvaamaan hiilinielu-termin käyttötapoja yksityiskohtaisemmin. Pääkehykset jakaantuvat erilaisten hiilinielu-termin painotusten perusteella kahteen keskenään riitelevään kommunikointitapaan sekä välimaastoa edustavaan kolmanteen kehykseen. Välimaastoa edustava kehys tunnistaa kaksi keskenään riitelevää kehystä kommunikaatiotavoiksi ja ehdottaa osapuolten välille yhteisymmärryksen tavoittelua optimaalisen ilmasto-, metsä- ja hiilinielupolitiikan saavuttamiseksi korostaen muun muassa näyttöön perustuvan politiikan sekä keskusteluilmapiirin polarisaation loiventamisen tärkeyttä. Pohdin tunnistettuja kehyksiä erityisesti niiden politiikkayhteyksien näkökulmasta. Pohdin myös, kuinka ne kertovat mahdollisesta metsäpolitiikan ja -keskusteluilmapiirin kehityksestä. Tutkimuksen oleellisimmat johtopäätökset näyttävät hiilinieluihin liittyvien erimielisyyksien johtuvan siitä, kuinka metsätalouden rajoitteiden koetaan vaikuttavan hiilinielutasoihin ja kuinka merkittävässä roolissa metsäpolitiikan tulisi olla kansallisten ja kansainvälisten ilmastotavoitteiden saavuttamisessa. Tutkimus vahvistaa ennakkokäsityksen siitä, että hiilinielu terminä taipuu erilaisten politiikka-agendojen tueksi muun muassa määritelmällisten ja laskelmallisten epävarmuuksien vuoksi.

Avainsanat
hiilinielu, kehystäminen, metsä, Suomi, media, metsäkeskustelu

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1. Introduction

Issues around forestry are in a special focus in public discussion around climate change in the forest-rich Northern European country, Finland. Different societal actors promote clashing views over the optimal use of forests decade after decade. One key domain where these views are contested is in the media. The media in turn affects the society and its policymaking processes by having the power to discuss issues around forestry in multiple ways. In this master's thesis, I draw a rough picture of the recent years' forestry discussion in Finland and focus especially on the way that newspaper media has framed these conversations around the concept of *carbon sinks.*

Carbon sink as a term is nothing new to scientific research, but it rapidly entered climate policy discussions in the 2010s alongside a general rise in the public's interest in climate change topics. But when societal actors use the term differently by stressing certain details of the term or leaving some unmentioned, varying understandings of the term can spread. Carbon sink is defined by different institutions in clear ways, but the popular definitions vary in detail ([1]; [2]; [3]). That variation may leave space for carbon sink debaters to creatively argue for their suggested optimal forest and climate policies. I attempt to identify these ways of communicating and arguing carbon sink issues by using the methodologies of both frame analysis and content analysis on a material collected from four Finnish major newspapers in 2016–2019. In addition to studying the transformation of the term by the media, I seek to uncover whether the different ways of using the term have linkages to certain policy agendas or actor groups.

In the 2010s, climate change, along with many of its scientific features gained somewhat a special status in public discussion. Because of the media's role in communicating the scientific details, it's especially important to examine the ways in which media has used key concepts. The decade was characterized by startling warnings about the threats of climate change from the academia in the different IPCC reports (see, e.g., IPCC, 2014), the UN reaching the Paris Agreement in 2016, the increasing forest fires around the world, and public figures like Donald Trump and Greta Thunberg who represent a polarized field of discussion in politics and the media. The EU attempts to be a global forerunner in ambitious climate policies by setting its climate policy targets towards reaching carbon neutrality by 2050 (EU Commission, 2020). In

[1] The Finnish Climate Change Panel (2017, p. 17): "an increase in the carbon storage of a forest" / "a positive change in the carbon balance counted in a certain time scope" (translated from Finnish)

[2] IPCC (2000, p. 598): "Natural or man-made systems that absorb CO2 from the atmosphere and store them. Trees, plants, and the oceans all absorb CO2 and, therefore, are carbon sinks."

[3] IPCC (2018, p. 558) "A reservoir (natural or human, in soil, ocean, and plants) where a greenhouse gas, an aerosol or a precursor of a greenhouse gas is stored. Note that UNFCCC Article 1.8 refers to a sink as any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere."

Finnish politics, the latest 2019 government set a national target of reaching carbon neutrality in an even more ambitious schedule, by 2035, alongside a governmental program that promotes the importance of evidence-based policymaking (Finnish Government, 2019). At the same time, the National Forest Strategy of Finland includes the target of increasing the annual harvest of domestic wood from the current ca. 66 million m3 to approximately 80 million m3 by 2025 (Finnish Government, 2015).

Serious mismatches between science and forest policy have been brought up by recent research (see, e.g. Norton et. al, 2019; Bios, 2017). Research indicates that forest conservation plays a significant role globally in preserving the biodiversity of ecosystems and mitigating climate change by absorbing atmospheric carbon dioxide. On the other hand, climate change is tackled by replacing the use of fossil fuels; the forest industry offers a solution to that problem with forest-based renewable alternatives such as wood-based bioenergy, plastics, and biofuels. The ambitious Finnish carbon neutrality target puts pressure on the current government to adjust national climate policies, but the opinions on what the optimal way of reaching carbon neutrality differ among politicians, interest groups and even scientists. A media study of the past decade's forest discussions both helps to understand the contours of the debates around carbon sinks and may shed light on upcoming concerns, challenges, and developments in optimizing carbon sink policies and mitigating climate change in the 2020s.

Recent forestry debates linked to Finland, climate change and carbon sinks have occurred around the best silviculture practices, the end use of wood products and the conservation of forest biodiversity, to name a few topics. Considering international policies, the EU Lulucf setting[4] and RED II[5] legislation process have been topics raising loud discussion. The background of each topic is complex, but the discussion may be reduced to a simple debate over whether or not Finnish forestry is sustainable if the amount of forest cuttings are increased or decreased. Finnish forest discussion could be said to have even chronic features, with some actors refusing to budge from their preconceived ideas about optimal climate and forest policies. An analysis of a focused media material can ably demonstrate the existence of tensions in the forest discussions. Focusing the frame identification process on carbon sinks may expose new perspectives on how the concept takes multiple shapes and is thus used to promote varying policy agendas.

[4] EU Lulucf = "Regulation (EU) 2018/841 on land use, land use change and forestry (LULUCF) defines accounting rules for how the sinks and emissions from land use, land use change and forest management are taken into account in the EU's climate targets for the period from 2021 to 2030" (Ministry of Agriculture and Forestry of Finland, 2020)

[5] A recast of the Renewable Energy Directive = " In November 2016, the European Commission published its 'Clean Energy for all Europeans' initiative. As part of this package, the Commission adopted a legislative proposal for a recast of the Renewable Energy Directive. In the context of the co-decision procedure, a final compromise text among the EU institutions was agreed in June 2018. In December 2018, the revised renewable energy directive 2018/2001/EU entered into force." (EU Commission, 2019a).

This study is an analysis of the Finnish media's characterizations of carbon sinks in forestry discussions. It is a continuation to literature that examines the relationship between discourses and politics of forestry, environment and climate change. Such literature in the Finnish context have focused on bioeconomy narratives in the Finnish media (Peltomaa, 2018; Peltomaa & Kolehmainen, 2017), stakeholder frames in the making of forest bioenergy legislation (Huttunen, 2014) and media framing forestry issues from multiple other perspectives (Väliverronen, 1996, *as an example of an early work*). The topic also sheds sight to the report published by the Finnish Climate Change Panel (2019) that brought up a need for more accurate defining of what is meant with carbon neutrality in climate policy.

First, I present the media as a societal actor (1.1) to further introduce the study topic. To bring the analysis deeper into the media discussions' context, I take a brief look into Finnish forestry, its history, and some debated topics involving carbon sinks (1.2). The introduction ends in sub-section (1.3) where I present the aims of the thesis alongside the research question. The study then proceeds following a typical structure of a master's thesis including a theoretical framework (2) and a section for methods and data (3). I then present the media frames that result from the analysis (4), leading to the end of the thesis in sections for discussion (5) and conclusions (6).

1.1. Media as a societal actor

In his book *Mass Communication Theory*, McQuail (1994, p. 327) writes: "The entire study of mass communication (...) is based on the premise that the media have significant effects." This sub-section explores some of these effects by presenting various media studies. The media is an important societal actor in democratic societies, where the role of media is relevant especially in informing people and providing the society a platform for public discussion (Kleinschmit & Sjöstedt, 2014). Political decision-makers may use media as a measure of public opinion (Kleinschmitt & Krott, 2008).

The media affects the society, the reality and its policy-making processes also in a broader way, which can be described by using the term *media logic*[6], that can be used to describe the media working in certain ways that can be specified.

[6] "In general terms, media logic consists of a form of communication; the process through which media present and transmit information. Elements of this form include the various media and the formats used by these media. Formats consists, in part, of how material is organized, the style in which it is presented, the focus or emphasis on particular characteristics of behavior and the grammar of media communication. Format becomes a framework or a perspective that is used to present as well as interpret phenomena.'' (Altheide & Snow, 1979, p. 10)

The ways of media logic are adapted by societal actors who attempt to reproduce this logic, thus affecting the media's role in society in turn (Altheide & Snow, 1979). An example of one way that media affects the reality would be different actors producing events only to get published and thus gain publicity (Kepplinger, 2002). This kind of 'mediatization of politics' (see e.g. Altheide & Snow, 1979) has been studied and confirmed to exist among forest-policy actors in Sweden (Kleinschmit & Krott, 2008), which is why a speculative question for later is whether the mediatization of politics occurs in Finland, too. Other studies on media logic have been conducted about the use of selection criteria in the media (Galtung & Ruge, 1965). Policymakers can make use of adapting the selection criteria to have their voices heard (Schulz, 2004).

Väliverronen (1996) examined how environmental issues are built in the media as societal problems, with a special focus of the relationship of media, science, and politics. He applies this point of view to the topic of deforestation in the Finnish forests in the 80s and 90s and asks how different societal actors defined deforestation at the time. The analysis in this thesis is partly influenced by Väliverronen's analytical constructs in terms of combining multiple aspects of frame analysis on newspaper articles. Väliverronen also emphasizes the importance of understanding that what happens in the 'world of texts' is not separate from what happens in the real world because of different social practices (Väliverronen, 1996, p. 40).

One way of assessing the media's power as a societal actor is to study its 'discursive power' (Väliverronen, 1993, pp. 29–33), which is the power to define and construct reality, and that is why it also can be power to define certain phenomena (such as carbon sinks). Thus, a media analysis may not only be about studying representations of the social reality, but societal practices, too. Discursive power is one way of creating, presenting, and regenerating societal power relations. Media has a role in forming societal power relations, identities, and thus has a role in building societal capabilities and inabilities. A relevant question can be asked: what kind of space do journalistic practices leave for different actors to say in the media? The question can be applied to this thesis by asking what kind of space the media allows for different actors to define carbon sinks.

Väliverronen (1996, pp. 44–45) also grasps on media building an image of science as he raises the point that scientists as experts have significant roles in defining especially environmental problems. An interesting part of studying the media's communication of environmental problems is not only what kind of knowledge the media distributes, but who the media chooses and titles as these experts. Science makes environmental problems a reality by conducting research and identifying the problems. In turn, media distributes these findings. Identifying environmental problems does not always require a scientist, but this dimension is important especially in 'making the invisible visible'. A simple example of making a global

invisible phenomenon visible would be climate change. One does not perhaps perceive climate change in everyday life, but its presence through alerting messages from the academia and publishing in the media make it more real and concrete. Forests, as carbon sinks, are just as clear of an invisible phenomenon that the media has had a strong influence in making visible. Thus, the role of scientists and their relationship with the media is important, too. Their relationship with the media can be examined and discussed by comparing which actors are present in certain newspapers. How scientists are able to generate conversation about environmental problems is relevant for environmental discussions gaining space in politics, but the media also plays an important role in choosing who gets to define problems and their solutions.

As a concluding remark, I return to McQuail (1994, p. 69) and repeat his list of the ways in which media has the greatest potential to affect society, by: attracting and directing public attention; persuading in matters of opinion and belief; influencing behaviour; structuring definitions of reality; conferring status and legitimacy; and informing speedily and broadly.

1.2. Background: Forestry and forest politics in Finland

Finland is the most forested country in Europe in terms of percentage of land area covered by forests (World Atlas, 2019). It has a long history of forestry, making forests a cornerstone of Finnish national identity both culturally and economically (Väliverronen, 1996, p. 28). In the 20th century, forestry was the single most important industry in creating wealth, growth and exports for Finland—but in the 2000s, its influence on the national economy has decreased (Hetemäki & Hänninen, 2013). Also, during the years 2004–2011 almost a third of the pulp and paper industry's jobs disappeared (Maaseudun Tulevaisuus, 2013). In the 2010s, the forest industry managed to get past their hardest times and the three largest Finnish forest companies either broke or came close to matching their revenue records in 2018 (Helsingin Sanomat, 2020). The recent years' growth can be partly explained by increasing demand for pulp in Asia for packaging materials (Jokiranta et al., 2019, p. 149) and by both Finnish national and international policies that aim to increase the use of renewable energy in the form of forest-based bioenergy (*discussed below*).

Hetemäki (2009) concluded that Finnish forestry is going through the same magnitude of change as it faced in the late 1800s when pulp and paper production replaced the production of tar. Such a shift from traditional forest products can be seen happening now from paper products to bioenergy (Hetemäki, 2009). The term 'bioeconomy' is used to promote a broad variety of different goals, ranging from the use of advanced molecular level biotechnology to replacing the use of fossil-fuels with the burning of forest-based materials (Peltomaa, 2018). Although often loaded with a positive message, bioeconomy has also been described as a

greenwashing strategy for traditional forest companies that mostly attempt to keep their business running as usual (Jokiranta et al., 2019, pp. 149–159).

Examples of the bioeconomy trend can be seen in the language used by the largest Finnish forest-based companies, who define their businesses as something other than a forest company. Stora Enso defines themselves as a 'renewable materials company' (Stora Enso, 2020), UPM as a 'forest-based bioindustry company' (UPM, 2020) and the Metsä Group, in a milder manner, as a 'responsible forest industry group' (Metsä Group, 2020a). Finland's largest wood-processing facility, the Äänekoski biorefinery of Metsä Group, could possibly be called something other than a biorefinery: 80% of its turnover is based on trading traditional pulp products, while the remaining 20% is based on bioproducts such as bio gas, wood-based liquid fuels, and sources of wood-based energy produced from pellets and other forest residues (Liikanen, 2019 as cited in Jokiranta, Juntti, Ruohonen & Räinä, 2019).

Forest-based bioenergy as a part of bioeconomy a strongly emphasized strategic source of energy for the country. The emphasis can be seen when analysing different national forest policy steering documents such as the Finnish Climate and Energy Strategy, where bioenergy is posited as a means by which to reach different sustainability, economic and societal goals (Ministry of Economic Affairs and Employment, 2017). The Energy and Climate Roadmap 2050 is a supporting document to guide Finland in reaching the targets set in the Strategy, such as carbon neutrality. In all the document's scenarios for reaching a low carbon Finland, the increase of renewables is relevant (Ministry of Economic Affairs and Employment, 2014). Many of Finland's long-term objectives and paths to reach them are introduced in the document. Bioenergy in particular is emphasized as a renewable energy source with arguments based on energy self-sufficiency, national expertise related to the energy use of forest biomass, cost-efficiency, and employment factors.

Some scientific disagreements about the sustainability of bioenergy production are presented in the Roadmap's SWOT analysis for Finland's bioenergy strategy, which condenses some of the topic's relevant debated matters (see *Table 1.1)*. The sustainability issues of bioenergy are brought up as part of ongoing national, EU, and global debates, but the document can be interpreted as having a clear bias in favor of the pros of bioenergy. (For a more thorough analysis of forestry and energy politics, one could take a deeper look into the Finnish Forest Strategy, the Bioeconomy Strategy, and policy documents covering national emergency supply themes).

Finland's strengths	Finland's weaknesses
• From the perspective of sustainable felling capacity, there are no obstacles to the strong increase of the energy use of domestic biomass • Cost-efficiency of forest chips • Efficiency of biomass energy use in forestry, CHP plants and heat boilers • Expertise related to the energy use of biomass (boiler technology, biofuel technology, procurement chains, distributed production) • Domestic biomass will reduce the import of fossil fuels	• Deviation from "mainstream" EU; Finland's forestry industry, wood-refining industry and the integrated bioenergy production are not typical in the EU • The possibility of the state to finance the implementation or use of biomasses to a broader extent and the unpredictability of the EU's state subsidy policies • Economic non-profitability of first thinning and the management work of a young forest
Opportunities for Finland	**Threats for Finland**
• Export of cleantech technology • Building of new types of resource-efficient value chains and the profitability and environmental benefits obtained from them • Developing distributed production as part of the energy policy	• Global development related to the sustainability and carbon-neutrality of biomass, particularly the change of international and EU-level greenhouse gas emission calculation rules • Impact of policy changes on the demand for advanced traffic biofuels and on the profitability of investments • The position of biomass and its use in the international climate policy is yet to be organised • The capacity of the forestry industry will not grow, which will limit the level of wood harvesting • Poor profitability of new CHP plants • Difference between the regional supply and demand of forest biomasses • Effect of the broad-scale use of forest biomass on nature diversity

Table 1.1. SWOT analysis of Finnish bioenergy use in the future in Energy and Climate Roadmap 2050 (Ministry of Economic Affairs and Employment, 2014, p. 34).

Although the Climate and Energy Strategy shows only one side of the basis on which forestry decisions are made in Finland, it also exposes some of the tensions that are present in public forest discussions. Kröger & Raitio (2016) studied Finland's current possible 'forest political pathway' by examining multiple relevant forest policy steering documents. They conclude that the dominant policy pathway in the current 'bioeconomy era' tries to answer different sustainability issues by producing 'more of everything' under the guise of bioeconomy. They describe this as a problematic pathway because it includes controversial goals (Kröger & Raitio, 2016). Pilpola & Lund (2018) also discuss how biomass-based energy production poses sizeable risks for a low-carbon energy transition.

Finnish forestry is criticized by many for reasons linked to biodiversity loss and climate change mitigation. But, it has defenders other than just industry representatives and politicians. For example, Kauppi (2018) brings up a critical view in response to the criticizers of forestry, arguing that the increasing of the use of wood is necessary from the perspective of conserving the environment. An often cited official, Petteri Taalas (the Secretary-general of the World Meteorological Organization (WMO)), often defends Finnish forestry in private interviews and the media (see, e.g., Iltalehti, 2018; Polte, 2018; Maaseudun Tulevaisuus, 2018), while also gaining criticism from scientists (YLE, 2019).

Kotilainen & Rytteri (2011) identified the following Finnish forest policy eras that have come and gone in the last two centuries: emphasizing sustainable forestry, technological development, increasing international trade, and promoting institutions such as forest land ownership. A speculative question for later discussion is whether the current era of Finnish forestry will be seen as an era of heavy use of forestry due to supportive policies and a strong bioeconomy narrative. Or, will it be seen as a phase in which Finnish forestry evolved towards an actually sustainable industry, in the word's deepest meaning. The question cannot be answered in the scope of this thesis, but a media study contextualizing the discussion helps describe the current era and can generate rich discussion and speculation. The probable answer to the question above is neither, because the reality of the situation is not black and white at all. However, a contextualization of the discussion can also serve to identify the grey area. The current Finnish government is in the process of tightening national climate policies with concrete actions in the near future, having set a new 2035 carbon neutrality target with a simultaneous emphasis on evidence-based policy. The government has not yet presented how the country will attain that target—but in the recent years' discussions, both in politics and the media, the role of forests as carbon sinks is continually brought up.

1.3. Thesis aims

I present the research question and the core interest of this study as follows: *What kind of media frames appear in the forest discussions around carbon sinks in Finnish newspapers during years 2016–2019?* I discuss the frames as the results of the thesis in terms of how the term "carbon sink" is used to promote different policy agendas. Moreover, a special attention is given to the role of different actors in the frames. With these goals in mind, this thesis attempts to contextualize recent years' carbon sink discussions.

I acknowledge that some presumptions and hypotheses may affect the research process. The official Finnish carbon sink levels, according to the EU Lulucf instructions, are published by Luke (National Resources Institute of Finland). But, the effects of different policy actions on carbon sink levels are assessed in public discussion by all kinds of actor groups. Other discussion participants include, presumably, various interest groups, such as: forest industry representatives, bioenergy producers, environmental NGOs, forest owners, forestry contractors, foresters, researchers, and government officials (as Huttunen (2014) lists, for example). Because a consensus over optimal carbon sink policies has not been reached among all groups and the discussion is likely to have a political tone, I attempt to stay as neutral as possible when assessing different actors and their proposed policies. At this point, I leave a deeper examination of the carbon sink discussions for later. The frames, as reflections of different ways to communicate about carbon sinks, are the results of rather than the background to this thesis.

2. Analytical framework

This section presents various literature on framing theory, its applications in social science and media studies, as well as a brief look into earlier framing research on forestry-related topics. Framing is a popular theory in studying social movements and communication and can be especially helpful in conducting a media analysis (Winslow, 2017). The study of frames was first introduced in literature by Erving Goffman (1974) and has developed through present day as both a popular conceptualization and a methodology in multi-disciplinary social science research. Frame analysis can be discussed when conducting research focused on 'frames'. Goffman describes the concept as: actors creating specific interpretations of an issue by using a 'schemata of interpretations'. That is to say, frames refer to how we act or how we define situations through our action. Goffman's definition also emphasizes the feature of reality being socially constructed in general and, constructed by framing. Reality can be described in a multitude of ways and those descriptions of reality, in turn, reveal features about the source of the description. (Goffman, 1974)

Framing has been applied in social science by Snow & Benford (see e.g., 1988; 2000), who see framing as an active process of actors attempting to get the public to accept their views and definitions of societal problems. They define framing as a process of giving meaning to complex issues by simplifying and condensing specific aspects of the problems discussed. Schön & Rein (1996) argue that, especially when an issue has conflicting features, actors select and emphasize specific aspects of information to harness the power to define the issue. Frame analysis is a well-suited tool for analyzing the recent years' discussions around carbon sinks, because Finnish forestry debates clearly have those conflicting features.

Applications of frame analysis in media research focus on the study of 'media frames.' Media frames can be defined as "a central organizing idea or a story line that provides a meaning to an unfolding strip of events (...) The frame suggests what the controversy is about, the essence of the issue" (Gamson & Modigliani, 1987, p. 143). Framing in media studies takes the nature of journalism as a socially built reality, where news articles not only distribute certain views of reality, but also shape these views (Tuchman, 1978, p. 12). Gamson & Lasch (1983, pp. 398–399) describe media frames as 'interpretative packages.' A journalist writing a news article is often driven by a certain frame or an interpretative package, which is distributed to the public when the article gets published.

Frame analysis can be conducted in many ways. Snow & Benford (1988), for example, identify three different types of framing: diagnostic, prognostic and motivational. 'Diagnostic framing' means defining a problem and pointing out actors in a conflict that cause or are victims of the problem. Problems need to be named and identified to become problems; pointing out the causers and victims makes the problem more

concrete and easier to discuss. ‘Prognostic framing’ offers a solution to the defined problem. ‘Motivational framing’ attempts to provide a ‘call to arms’ or a rationale for action.

Gamson et al. (1992) analyze frames by finding certain key words, metaphors, phrases, visual pictures and symbols. They also note that it is possible to study the framing of a single event such as the cuttings of a certain forest area or an environmental accident such as a forest fire. Moreover, broader discussion topics can be framed. Examples of the latter could include climate change, nuclear power, or sustainable forestry.

Frame analysis can be conducted with both qualitative and quantitative approaches. I take a qualitative and a hermeneutic perspective in identifying the frames. A ‘hermeneutic’ approach emphasizes subjective interpretations of meanings in the text (Gillan, 2008), which in the case of this thesis means that I build the frames by interpreting some kind of a central organizing idea around carbon sinks. This is done by an iterative reading of the texts, which should reveal the basic meaning-making structures of the articles. To help in the methodological frame-building process, I point to certain framing functions, derived from Entman (1993): (1) a definition of the central problem presented; (2) the cause of the problem; (3) moral interpretations on right and wrong related to the issue, and; (4) a suggested action for solving the problem.

Previous framing analyses have ended up identifying repeatedly occurring frames, such as the conflict frame, the attribution of responsibility frame, the economic consequences frame, and the human interest frame (Scheufele, 1999, p. 106; Neuman, Just & Crigler, 1992, p. 64; Semetko & Valkenburg 2000, in De Vreese 2005, p. 56). A frame analysis could be conducted deductively, meaning that the frame identification process would be led by these standard frames mentioned above. An inductive approach can also be taken, meaning that the frames emerge as the research progresses. My approach, as explained more in the section for methods and data, is more inductive, but I acknowledge that the existence of the previously identified frames might steer the process.

In addition to identifying the different media frames, I examine which actors are present in the frames. While newspapers get to decide whose voice gets heard in their news publications and stories, different societal actors compete to get their own definition published (Gurevitch & Levy, 1985). Whoever gets their views presented can be described by the term ‘standing.’ Standing refers specifically to a situation where someone gets to define a certain problem with their own voice (Gerhards & Schäfer, 2007; Ferree et al., 2002). I focus especially on these standing actors and who those standing actors claim to be the problem causers.

As a conclusion, I repeat Entman 's notions (1993, p. 52) that frame analysis can define problems, diagnose courses, make value judgements, and suggest remedies. Moreover, it can describe communication content,

test hypotheses of message charasteristics, compare media content to the “real world”, assess the image of particular groups in society, and establish a point form which media effects can be studied (Wimmer & Dominick, 2006, p. 152-153). These are all points to keep in mind during the analysis process and when discussing the results. D’Angelo & Kuypers (2010, p. 2) list varying descriptions of framing as *a concept, an approach, a theory, a class of media effects, a perspective, an analytical technique*, all of which could be seen applying to this thesis, too. To make a clear difference, this section's framing literature is supposed to mainly present framing as a theory and an approach. I complement the framing theory in the next section with literature on content analysis as the more technical methodology to clearly specify what and how I identify the frames in the analyzed texts.

3. Methods and data

3.1. Content analysis

According to White & Marsch (2006), content analysis provides flexibility as a method to study many kinds of research questions in a broad variety of disciplines. Thus, I use content analysis to describe the functional aspects of the analysis more accurately, whereas the theory section provides an analytical perspective to understand what the framing concept means and might be used for.

Content analysis can be applied both as a quantitative or qualitative method, or a combination of the two. Being able to mix the two provides flexibility in choosing the material and coding of data (White & Marsch, 2006). According to Tuomi & Sarajärvi (2002), content analysis is mostly used to locate 'humane meanings' from data. The data can then be classified into categories and sub-categories that each represent different meanings associated with the research topic (Weber, 1990).

Another way to describe the method, content analysis, is as a "research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff, 2004, p. 18). White (2006) emphasizes the notion of inference in content analysis. The researcher has to use "analytical constructs, or rules of inference, to move from the text to the answers to the research questions" (White & Marsch, 2006, p. 27). According to Krippendorff (2004, p. 173), the analytical constructs can be derived from existing theories or from the practice, experience, or knowledge of experts. I mostly use framing as the theory for the analytical constructs of building the frames. The analysis of the news articles' special carbon sink emphasis is, however, not strictly derived from framing theory, but from the flexibility that content analysis provides as a methodology.

Graneheim & Lundman (2004) differentiate between analysis units that differ in terms of whether they are so called 'manifest' or 'latent' content. 'Manifest content' deals with the content of the data and describes the visible, obvious components of the text used as data, whereas 'latent content' deals with the relationship aspect of the data and involves an interpretation of the underlying meaning of the text (Graneheim & Lundman,2004; also Downe-Wamboldt, 1992). I have to involve with both kinds of content when processing the data, because identifying media frames requires identifying the central organizing ideas of the news articles (Gamson & Modigliani, 1987, p. 143), "which presumably does not stick out as obvious on an initial reading of the texts."

3.2. Data collection

The material for the analysis was collected from four Finnish newspapers: Helsingin Sanomat (HS), Maaseudun Tulevaisuus (MT), Kauppalehti (KL) and Keskisuomalainen (KSML). The four newspapers were

selected based on their possible differing perspectives on bioeconomy issues and their varying representation of regional and business themed news. *Helsingin Sanomat* is the most popular general daily newspaper in Finland, with 672 000 daily readers and issues published daily (Sanoma, 2019). HS provides presumably a general view of the public discussion in the Finnish media. Although, as the newspaper from the capital city it might actually represent the views of people from the city rather than the view of the general public of Finland as a whole. *Maaseudun Tulevaisuus* has three issues published weekly, the second most readers, (322 000) (Maaseudun Tulevaisuus Mediamyynti, 2019), and represents the largest newspaper with a focus on rural issues in Finland. The publisher of MT is owned by the Finnish Central Union of Agricultural Producers and Forest Owners (MTK). Keskisuomalainen is a major regional newspaper based in Central Finland, with daily published issues and 124 000 daily readers (Keskisuomalainen Mediamyynti, 2019). KSML might offer interesting forestry discussion perspectives because the forest industry is traditionally a major employer and is culturally important in Central Finland. Moreover, the world's largest wood-processing plant in the Northern Hemisphere, Äänekoski bioproduct mill, is located in the area (Metsä Group, 2020b). The fourth studied newspaper, Kauppalehti, is the largest business media in Finland with 241 000 readers and five issues published every week (Alma Media, 2019).

The data consists of news articles that contain the search word ‘hiilinielu’ (Finnish for ‘carbon sink’; search conducted in 14th January 2020) in the newspapers’ E-services in the years 2016–2019. The whole population (*see table 3a)* totalled 856 articles, 411 of which were found in HS (48%), 343 in MT (40%), 59 in KSML (7%) and 43 in Kauppalehti (5%). The proportional presence of ‘carbon sink’ articles in the newspapers shows a clear dichotomy between HS & MT as the 'big' and KSML & KL as the 'small' newspapers, in terms of which newspapers cover carbon sink themed topics. Another interesting point that was discovered when choosing the time scope of the analysis: only 121 'carbon sink' articles were found in the four newspapers in years 2011–2015. This is evidence that carbon sink topics occurred more frequently in the public discussions in the latter half of the 2010s'.

Phase 1. To choose the number of articles to be analyzed, I narrowed down the population of 856 articles into the final selection of 108 articles (*see the full list in references)*, which was based on randomization. I divided the population with 8 (*856/8=107)* and rounded the total upward to make the data divisible by four (newspapers).

Phase 2. Altogether, 37 (35% of the population) articles were collected from both HS and MT while 17 (15%) articles were collected from both KSML and KL. This was based on both the larger distribution and the larger share of 'carbon sink' articles in HS and MT, which makes them presumably more relevant in

analyzing the public media discussion as a whole. The population was also unbalanced among the years 2016–2019, in terms of 44% of the articles having been published in 2019 as compared to only 9% in 2016 in the four years' time scope, for example. Thus, in addition to a balancing of the newspapers' representation according to their size and relevance, a mild balancing was done in terms of a more even representation of the studied years. These two ways to balance the data were both done with randomization.

Table 3a – Original population

	HS	***MT***	***KL***	***KSML***	***Total 'hiilinielu' hits 2016–2019***
	411	***343***	***43***	***59***	***856***
2019	*221 (53%)*	*109 (32%)*	*23 (53%)*	*24 (40%)*	***377 (44%)***
2018	*85 (21%)*	*68 (20%)*	*8 (19%)*	*17 (29%)*	***178 (21%)***
2017	*70 (17%)*	*126 (37%)*	*10 (23%)*	*14 (24%)*	***220 (26%)***
2016	*35 (9%)*	*40 (11%)*	*2 (5%)*	*4 (7%)*	***81 (9%)***

Table 3b – Data after narrowing down and applying special exclusion criteria

	HS	***MT***	***KL***	***KSML***	***Total articles analyzed***
	37	***37***	***17***	***17***	***108***
2019	*14****	*14*	*7*	*7*	***42 (39%)***
2018	*9*	*9*	*4*	*4*	***26 (24%)***
2017	*9*	*9*	*4*	*4*	***26(24%)***
2016	*5*	*5*	*2*	*2*	***14 (13%)***

Phase 3. After ending up with a certain amount of articles from each newspaper to be included in the data, the articles were picked from the search hit results evenly throughout the year. For example (see *Table 3b****), the 14 articles included in the data from HS in 2019 were chosen by picking every 15th article of all the 'carbon sink' articles in HS in year 2019 (221 total of 2019 HS articles / 14 = 15,78...).

Phase 4. After having exported the articles to an Excel sheet according to *Table 3b* and *Phase 3,* I applied some special exclusion criteria to a group of articles. These special exclusion criteria included news articles representing the nature of disaster journalism about the Amazon and Australia forest fires in 2019, for example. Most of the manually excluded articles focused yet clearly on other issues than forestry topics, such as agriculture, swamp land conservation, or carbon sinks mentioned with a weak linkage to forestry or climate change policy (*see the full list of the manually excluded articles in references*). If an article was excluded, it was replaced with the next article of order in the search results.

3.3. Analysis process

In terms of the concrete analysis process, the data was collected and processed in Excel. The frame identification process can be initiated by answering the questions *what* and *how* I analyzed the data. In the end of this section, I also describe how the actors were analyzed. The *what* part of the frame identification process implies that the text is analyzed for "symbolic devices" or "signature elements" within news articles (Gamson & Lasch, 1983, 399). I chose to identify the following framing functions (from Entman, 1993): (1) a definition of the central problem presented; (2) the cause of the problem; (3) moral interpretations on right and wrong related to the issue; (4) suggested action for solving the problem. Because the focus of this thesis is carbon sinks, special attention and weight in the frame identification were given to certain definitions and emphases of carbon sinks (5). All of the Entman's framing functions and the carbon sink emphasis were collected in the Excel sheet alongside multiple columns for gathering notes and the basic information of the texts. The basic information of the text included: newspaper, title, date, section and the URL address.

In terms of *how* the analysis proceeded, I followed Alozie's (2005, p. 66) three phases: (1) The analysis began by reading the news articles through iteratively, making notes and sketching the frames throughout the process; (2) The second reading round included identifying recurring themes, values, and topic categories, (3) which was followed with an in-depth interpretation of the articles. Altogether, each of the texts was read through in four rounds, with the last reading round being an inspection round to verify the frames.

The analysis included also the assessment of which actors and how they were present in the articles and the frames. This required listing all the actors present in the texts, which was followed by further classification as a standing actor or an enemy. An actor was coded as a *standing actor* if he, she, or an institution of some kind, had their opinions heard by being directly or indirectly quoted. The actors were assessed as *enemies* if a policy was criticized by clearly referencing the actors who promote the criticized policy. In general, it was noted whether a quote was used to promote or criticize certain policy suggestions or the central organizing idea that the article and its frame suggested.

In many cases, the news articles present the conversation from one viewpoint of a conflicting setting. But sometimes the topic of discussion is presented alongside an open acknowledgment that both sides of discussion exist. In the latter cases, the identification of standing actors or enemies was not as straightforward but required in-depth consideration. For example, an article might have included quotes from actors presenting conflicting interests. In some articles, the conflicting actors were evenly presented

in such a way that I could not clearly determine who were the standing actors. But, sometimes I assessed one actor to stand out and the other as an enemy because their opinions either were in line with or in opposition to the article's general thesis.

4. Results

The analysis eventually led into the formation of three 'dominant frames' that were further divided into eight 'secondary frames' to describe the different ways of communicating carbon sinks in more detail. A dominant frame can be regarded as the main theme of the news article, while the secondary frame is a supplementary idea that supports the main theme (Linström & Marais, 2012, p. 30). I explain each frame more accurately in sub-sections 4.1–4.3, named after the dominant frames. Each secondary frame (A, B, C) is linked to one of the dominant frames (1, 2 or 3) and is thus presented alongside them.

The frames were built according to multiple aspects. Many of the texts conveyed a clear understanding of carbon sinks, while in other texts these understandings were more difficult to identify, i.e, were interpreted from the underlying meanings (latent content) in the texts. Some articles emphasized certain aspects of carbon sinks that other articles gave little or no attention.

(1) 'Growing forests, stronger carbon sinks' frame stressed the feature of carbon sink level growing best by growing forests, which in turn is a result of active silviculture processes. (2) 'Increasing cuttings, weaker carbon sinks' frame took Finnish, European Union, and the UN Paris Agreement climate policy targets as a priority and linked carbon sink policies as a key way of attaining these targets. Because these two types of framing carbon sink issues could be roughly seen as counterforces to each other, (3) 'Complex carbon sinks' frame either implicitly acknowledged the varying ways of communicating (and understanding) carbon sink issues, or, centered its focus on issues other than what the more conflicting frames did. (*Tables 4a* and *4b* present a visual overview of all the frames)

	FRAME	*CARBON SINK EMPHASIS*	*CENTRAL PROBLEMS*
1	***GROWING FORESTS, INCREASING CARBON SINKS***		
1A	**FOREST INDUSTRY** Defends forest industry in a conflict against environmentalists	·A growing tree absorbs carbon / ·Active silviculture processes strengthen carbon sinks.	·Restricting cuttings ·Carbon leakage ·Polarized conversation blaming rural Finland ·EU climate policy targets for Finland ·Decarbonisation of society
1B	**INTERPRETATIVE CARBON SINKS** Criticizes the EU Lulucf and/or defends Finland's national interests. / · "The Finnish forestry lobbying front"	·The accounted level of carbon sinks is a result of calculation, which can be done in many ways. ·The level of carbon sinks is an interpretative and/or a polititical number	·Uncertainty of varying calculation methods. ·Finnish politicians lacking a shared goal of driving national interests.
1C	**FORESTRY AS THE SOLUTION** Active forestry is the solution to mitigate climate change: ·No significant conflict between Finnish forest industry, nature conservation and climate policy targets.	·Active forestry and developing silviculture practices is the best way to increase carbon sinks, mitigate climate change and maintain a strong forestry sector.	·Fair transition in climate change politics ·Forests that are not taken care of ·Silviculture practices: uneven-aged forest management ·Polarized forestry discussion does not lead into developments
2	***INCREASING CUTTINGS, WEAKER CARBON SINKS***		
2A	**CLIMATE POLICY TOOL** Takes National and EU Climate policy targets as a standard. Carbon sink policies should progress reaching the targets.	·Increased cuttings decrease carbon sinks in comparison to a situation with less cuttings. Carbon sink policies play a crucial role in reaching climate targets.	·Conflicts between bioeconomy targets and climate change policy goals
2B	**BIODIVERSITY** Takes climate policy targets as a standard as 2A, but main priorities are focused on biodiversity conservation.	·Ecosystems, such as forests or swamplands, are equal to carbon sinks. Protecting ecosystems strengthens biodiversity, which also leads into stronger carbon sinks.	·Overall biodiversity of the world is decreasing ·Silviculture practices: conventional, even-aged forest management ·Lacking ambition in climate policies
3	***COMPLEX CARBON SINKS***		
3A	**INNOVATIONS AS SOLUTIONS** Carbon sink politics matter but are not the priority in climate change mitigation. Technological, market-based innovations are the solution to mitigate climate change	·Fossil-based products are replaced with wood from forests but increased cuttings decrease carbon sinks.	·Mitigating climate change while maintaining a strong economy
3B	**DISCUSSION** Issues behind carbon sink policies are not black and white. A priority in climate change mitigation is to reach into a consensus on optimal carbon sink policies and act accordingly.	·Carbon sinks are presented from various points of views ·Acknowledges different emphasis on carbon sinks and promotes reaching an understanding between discussion participants.	·Polarized forestry discussion is a problem itself ·Synchronizing the diverse goals of actor groups in a democratic way
3C	**NEUTRAL SCIENCE & POLITICS** Carbon sinks presented from science's point of view with weak policy linkage or relatively unbiased policy analyses.	·Scientific carbon sinks from various points of view ·Different policy emphasis	·Developing research methods ·Lacking ambition in climate policies

Table 4a. Carbon sink frames

	FRAME	*MORAL INTERPRETATIONS*	*ACTION*
1	***GROWING FORESTS***		
1A	**FOREST INDUSTRY**	·Finnish forestry is the most sustainable in the world ·Finnish forests' growth exceeds cuttings: carbon sink strenghtens ·World-class Finnish forest expertise ·Forest owners' rights ·Securing a strong forest industry, national economy and employment	·Decarbonisation is a priority in climate change mitigation ·Incentives to support active silviculture practices and forest bioenergy production ·Opposing restrictions to forest use with a goal to receive international forestry investments in Finland
1B	**INTERPRETATIVE CARBON SINKS**	·Lulucf treats Finland unfairly in comparison to other countries ·Finland's national interests, well-being and sustainable forestry are in danger due to potential restrictions from the EU ·Finland and Sweden fight as one Nordic front against EU's forest regulation	·Opposing EU Lulucf calculations that would lead into restrictions in use of forests in Finland ·Promoting a national right and power to define carbon sink calculation methods due to superior Finnish forest expertise
1C	**FORESTRY AS THE SOLUTION**	·Supporting Finnish forestry is a climate act due to Finnish forestry expertise and its sustainable practices ·Carbon leakage ·Securing a strong forestry sector secures a strong economy	·Incentives to silviculture practices and forest bioenergy ·Decarbonisation of society
2	***INCREASING CUTTINGS, WEAKER CARBON SINKS***		
2A	**CLIMATE POLICY TOOL**	·Moral responsibility of Finland to mitigate climate change in the global front ·Climate change policies should be based on scientific evidence	·Regulatory actions for forest industry: criticize or decrease current cuttings Establish carbon markets ·More ambitious climate policy ·End peat production ·Evidence-based policymaking ·Establishing carbon markets
2B	**BIODIVERSITY**	·Worry for the well-being of ecosystems, animals, plants ·Protecting biodiversity ·Worry for next generations' futures ·A stronger biodiversity tackles climate change the best	·Swampland restoration, forest conservation, ·Establishing carbon markets ·Opposing clearfelling as a silviculture practice, ·Proponing evidence-based policymaking
3	***COMPLEX CARBON SINKS***		
3A	**INNOVATIONS AS SOLUTIONS**	·Strong economy, employment, market-based solutions as a base value while mitigating climate change is priority policy goal	·Incentives for innovation ·Promoting market-based solutions, carbon markets, planting forests in Africa, CCS technologies, biocoal, wood ash fertilizer ·Promoting other energy sources than wood based bioenergy (wind, solar, nuclear)
3B	**DISCUSSION**	·Polarized forestry conversation leads into polarization between urban and rural Finland, which has negative societal effects ·Clashing goals of actor groups can be achieved, but compromises may have to be made in both sides	·Reaching into a consensus among forestry discussion participants ·More peaceful tone in discussion ·Compromises ·Fair transition in climate change politics
3C	**NEUTRAL SCIENCE & POLITICS**	·Scientific objectivity ·Both public discussion and conversation within the academia are important to reach a consensus	·Develop research methods ·Evidence-based policymaking ·More ambitious climate change policy

Table 4b. Moral interpretations and suggested action

Identification of the frames was followed by identifying the different actors and how they were present in the texts (*Table 4c*). A standing actor was often either a directly quoted source of information or an opinion, or was, for example, the writer of the text in a guest column or editorial text. The specification of actors was based on which actor groups and their representatives were present in the texts (political parties, certain institutions, interest groups, NGOs, policymakers, EU, forest industry). Actors were specified as individuals if they were noticeably recurring in the texts.

	FRAME	*STANDING ACTORS*	*ENEMIES*
1	***GROWING FORESTS***		
1A	**FOREST INDUSTRY**	·Columns: MT ·Editorials: KL ·Paperiliitto, ·Metsäteollisuus Ry ·Centre Party ·Juha Sipilä (Prime Minister, Centre Party) ·Petteri Taalas, Pekka Kauppi ·Citizen (Engineur)	·The left-green alliance ·the Greens ·EU ·Climate radicals
1C	**INTERPRETATIVE CARBON SINKS**	·MEPs opposing calculation models leading to restrictions: Centre party, Swedish People's Party, National Coalition Party ·MTK, Metsäteollisuus Ry, Bioenergia Ry ·Luke	·EU Lulucf ·MEPs not in the Finnish forestry lobbying front
1C	**FORESTRY AS THE SOLUTION**	Pekka Kauppi, Petteri Taalas, Luke, University of Helsinki ·MTK, Metsänhoitoyhdistys, Metsähallitus, Tapio ·A writer, citizens ·Editorials: MT ·National Coalition Party, Centre Party	Other countries (and their forestry practices)
2	***INCREASING CUTTINGS, WEAKER CARBON SINKS***		
2A	**CLIMATE POLICY TOOL**	·Syke, Finnish Climate Change Panel, ·Greens, Universities of Helsinki, Eastern Finland, Jyväskylä, Citizens, ·NGOs **(**WWF, Fingo, Greenpeace, SLL) ·Markku Ollikainen	·Forest industry interest groups, Centre Party
2B	**BIODIVERSITY**	·NGO's, citizens, Greens	·Forest industry interest groups, Centre Party, ·Metsäteollisuus Ry,
3	***COMPLEX CARBON SINKS***		
3A	**INNOVATIONS AS SOLUTIONS**	·University of Eastern Finland, scientists, VTT, Luke ·Ministry of Agriculture and forestry, LSL, Metsäteollisuus Ry, Bioenergia Ry, Metsäkeskus ·Companies Greens, Centre Party, Prime Minister (Centre Party) ·Columns (MT), citizens (MT)	·Polarized forestry discussion participants, current forest policies and silviculture practices, bioenergy criticizers
3B	**DISCUSSION**	·Columns: MT (2), KL (1), ·Editorials: HS (2), KSML (1) Metsähallitus	·Polarized forestry discussion participants
3C	**NEUTRAL SCIENCE & POLITICS**	·Luke, ·Ministry of Forestry and Agriculture, IPCC, climate, atmospheric science researchers, University of Helsinki, VTT, Syke, Luke, Finnish Climate Change Panel	

Table 4c. Actors

4.1. Frame 1: Growing forests, stronger carbon sinks

A common element to all the articles classified under the ‘Growing forests, increasing carbon sinks’ frame was that they stressed the ability of a growing forest or a single tree to absorb carbon. This frame was further divided into three secondary frames (1A-C) by their differing framing functions and carbon sink emphasis. These were, for example, the kinds of actions that were proposed to solve the defined problem, what or who was being criticized, and, whether there was a conflict between the standing actors and other actors. A common feature to both frames 1A and 1B was taking international wood demand as a force of nature leading into the logic that restrictions should be avoided because Finnish forest policy decisions would not have a significant effect on the climate. In fact, restrictive forest policies were often seen to have negative climate effects because forestry as an industry was the suggested solution itself to mitigate climate change. This was emphasized especially in the 'Forestry as the solution' (1C) frame.

(1A) 'Forest industry' was the clearest secondary frame, with voices standing out that purely promoted forest industry interests, combined with stressing the carbon absorbing features of a growing tree (*Table 4a*). Also, certain actors in the forest discussions were seen clearly as an enemy. The main defined problems were restrictive policies such as decreasing yearly cuttings, which would lead into carbon leakage and negative economic effects.

The sustainability of Finnish forestry and silviculture practices was often emphasized together with arguments that forest growth exceeds the number of yearly cuttings, leading into the logic of Finland's carbon sinks increasing in the long run (*Table 4b*). Other argumentation that promoted the frame’s suggested policies were: forestry’s significance to the Finnish economy, and forest owners’ rights to decide the land use of their own forests. Because restricting cuttings was one of the main defined problems, the frame either defended current cutting amounts or suggested an increase to the cutting levels to achieve the targets set for bioeconomy and wood-based bioenergy use. The priority policy for mitigating climate change in the frame was decarbonization of society, to which the forestry had an answer: wood products replacing both fossil-based fuels and materials.

Individuals that stood out (*Table 4c)* most often in frame 1A were Petteri Taalas (the Secretary-general of WMO; former director-general of Finnish Meteorological Institute) and Pekka Kauppi (professor of environmental protection at University of Helsinki) who criticized the polarized forest discussion and restrictive forest policies while stressing Finnish forestry’s positive role in mitigating climate change. Other actors who stood out in the frame were Centre party politicians, The Finnish Paper Workers' Union (Paperiliitto), Finnish Forestry Organization (Metsäteollisuus Ry). Natural Resources Institute Finland (Luke)

was presented as a rather neutral actor, while obvious enemies of the frame were the Finnish Greens, climate radicals', the 'green-left alliance', and occasionally the EU.

If the 'Forest industry' (1A*)* frame was focused more on debates with national actors about national policies, (1B)' Interpretative carbon sinks' frame's clear target was bringing up the threat of potential EU legislation on Finnish forestry (*Table 4a).* Popular targets of criticism and debate were the EU Lulucf and the RED II settings, which would have an effect on how Finnish carbon sink levels are calculated and how forest bioenergy is treated in EU incentive systems. The name 'Interpretative carbon sinks' comes from the repetitive mentions of the possibility of official carbon sink levels being determined by the results of varying mathematical calculation models, and not according to actual biological and sustainability reasons. Temporally, this frame occurred most often prior to the years 2016-2017, in which Lulucf and RES II settings were central topical issues debated in the EU. The possibility of EU legislation restricting the Finnish industry's use of forests made carbon sink policies a priority matter of national interests. The frame represented mostly a lobbying front that defended national interests and criticized the EU. This lobbying front was was recognized and openly discussed as a planned national strategy in all the four newspapers.

Moral argumentation (*Table 4b)* supporting the frame's suggested policies included an emphasis on the outstanding Finnish forestry expertise, which, it was argued, should be utilized rather than restricted. The sustainability of Finnish forestry was again defined by the argument in favor of forest growth exceeding cuttings, and thus, carbon sinks rising in the long run. The articles in the frame described the EU carbon sink discussions mainly as a national fight against the EU. But, they also brought up Nordic co-operation and Sweden sharing similar national interests with Finland. On the other hand, criticism was targeted at the Lulucf setting being more favorable to Sweden, too. The main suggested policy in this frame was Finland's right to determine its carbon sink levels in its own ways and by its own calculation methods, which were claimed to be more accurate than other countries' and the EU's models due to supreme Finnish forestry expertise.

Actors standing out (*Table 4c)* in the frame were interest groups (MTK, Metsäteollisuus Ry, Bioenergia Ry), Luke as the institution behind the official Finnish carbon sink calculations, and politicians from multiple parties in the Finnish lobbying front. MEPs from the Centre Party, Swedish People's party, and Social Democrats were discussed as a united group of MEPs lobbying for Finland's interests, while other parties' MEPs (Coalition Party, True Finns, Greens and the Left Alliance) were either divided over the question or seen even as an antipatriotic group when opposing the lobbying front's view. The most significant actor group in the frame were politicians: Kimmo Tiilikainen and Juha Sipilä (Centre party), Nils Torvalds (Swedish People's Party), and Henna Virkkunen (Coalition Party).

(1C) ‘Forestry as the solution’ secondary frame was the black horse of frames 1A, B and C. Its articles stressed the carbon-absorbing feature of wood as was done in frames 1A and B. But rather than viewing its proposed actions as in conflict with other policy alternatives, the frame lacked specific actors or the EU as an enemy and focused more on the possibilities that forestry poses as a solution to mitigate climate change (*Table 4a).*

Active silviculture was stressed as leading to strong carbon sinks (*Table 4b)*. Thus, the frame suggested incentives for silviculture practices to secure a strong forestry sector in Finland and yet again used Finnish forestry knowledge and expertise as a moral argument. The frame suggested a strong forestry as a solution both to mitigate climate change and to secure a strong Finnish economy. The forest sector’s value to national economy was seen as crucial. A key argument of the frame was that maintaining a strong forestry sector in Finland is a climate act, which was often mentioned in conjunction to the points of carbon leakage due to global forestry markets and wood-based products and fuels that replace fossil-based products and energy. Using more wood as a construction material to replace fossil materials was used as an argument, to some extent, in all the secondary frames 1A-C, but most often in 1C.

Although the frame did not have any clear single enemies, it did see Finnish silviculture practices as superior to other countries’ practices (*Table 4c)*. It also criticized the culture of polarized forestry discussion in Finland, and encouraged the discussion and politics to center their focus more on solutions. Standing actors were mostly the same as in frame (1A) 'Forest industry', but a clear difference to 1A was the fair share of editorial articles in this frame.

4.2. Frame 2: Increasing cuttings, weaker carbon sinks

The second dominant frame could be roughly seen as a counterforce to Frame 1 (especially to secondary frames 1A and 1B). As the name implies, the frame is best described by its articles that stress that increasing forest cuttings would weaken carbon sinks in both the short and the long run, as compared to a situation where the cuttings would not happen (*Table 4a)*. As I did with Frame 1, I further divide this frame into secondary frames that have different emphases on the defined problem. The latter of these, ‘Biodiversity’ (2B) frame, was noticeably the weakest frame of all based on its low prevalence in the material.

(2A) ‘Climate policy tool’ frame took both national and international climate policy targets as a priority policy goal that carbon sink policies should pursue. While climate change, global warming, and sustainable

forestry were clear issues in the frame, the main defined problem to be solved was how to attain the climate policy targets (*Table 4a)*. The government's carbon neutrality target for 2035 and Finnish commitment to Paris Agreement were seen as forces of nature, in comparison to Frame 1, which rather took international wood demand as a force of nature.

Frame 2A saw that national forestry policies had an effect on concrete climate change mitigation, which led to questions about the sustainability of increasing the number of yearly forest cuttings or, more extremely, suggesting a decrease in cuttings (*Table 4b)*. Some saw a possibility of sustainably increasing cuttings also, with conditions such as decreasing bioenergy production and allocating the end use of forests for building materials, for example. Also, the climate policy targets were said to be achievable with increasing cutting levels, but only so long as other industries simultaneously decreased emissions due to the EU emissions trading system and possible changes in the EU Lulucf setting. Other clearly suggested actions were: increasing the level of ambition in national and international climate policies; ending peat production and establishing a carbon (sink) market. Arguments for the suggested policy goals were based on Finland's moral responsibility to do its part in mitigating climate change, a worry for the next generations' living conditions, and increasing evidence-based policymaking in climate politics. While questioning Finland's possible avenues to invest in new biorefineries or wood product factories, mitigating climate change was seen as a business opportunity. Other economic-based argumentation included a need for incentives to forest owners—current policies did not support maintaining forests as carbon sinks with more sustainable silviculture practices or conserving forest land.

Because Frame 2 could roughly be seen as a counterforce to Frame 1, actors standing out were mostly different (*Table 4c)*. Of the national research institutions, Luke was still an oft-occurring actor in the articles as it was in Frame 1. But this time, the Finnish Environment Institute (Syke) especially stood out. Scientists standing out were a more diverse group of universities and research institutions than in Frame 1. The most often occurring individual in the frame was Markku Ollikainen (professor of environmental economics at University of Helsinki; also, the chair of the Finnish Climate Change Panel and mostly cited according to that title in news articles). Of political parties, the Greens stood out the most with Social Democrats and the Centre Party also getting their voices heard; although, if any party's politics were seen as controversial to the politics promoted in Frame 2, it was the Centre Party. Interest groups only gained a voice in the frame as rather neutral actors, replaced by NGOs (WWF, Fingo, Greenpeace, SLL) standing out, compared to Frame 1. No single organizations were identified as clear enemies, but the forest industry as a whole and current forest policies were seen as conflicting with the policies promoted in the frame. The EU was seen as a neutral actor, rather than as an enemy or a standing actor, which goes in line with the frame considering international climate policy targets as a force of nature.

The articles in the (2B) ”Biodiversity" frame stressed the notion that increasing cuttings would lead into weaker carbon sinks, but differed from Frame 2A by emphasizing biodiversity loss as the main issue to be fought (*Table 4a)*. Climate policy tool (2A) frame brought up biodiversity issues of Finnish forestry, too, but there was a noticeable difference between the frames' emphasis of priority policies. Strengthening carbon sinks was still an important goal in 2B, but the carbon sink policy suggestions were more of a byproduct of biodiversity conservation policy suggestions.

Concrete actions promoted shifted from even-aged forest management to uneven-aged forestry, conserving forestland, and allocating end use of wood products to something other than energy production by burning (*Table 4c)*. Moral argumentation was based on animal welfare, the responsibility of a rich industrialized country to act against climate change, the alarming messages from academia about global warming, and, as the name of the frame implies, the importance of biodiversity conservation especially in combination with strengthening carbon sinks for mitigating climate change.

What was also notable in the articles in Frame 2B was their significant share in the opinion section of newspapers, where citizens alongside NGOs especially stood out (*Table 4c)*. Enemies of the frame were the loud promoters of bioeconomy, both in national and EU debates, examples of which were some Centre party politicians and Finnish MEPs, as well as forest industry representatives.

4.3. Frame 3: Complex carbon sinks

The third dominant frame represented a middle ground of the carbon sink discussions by either ignoring the conflicting setting that was present in Frames 1 and 2, or by presenting the debates and their actors from a relatively neutral ground. A neutral ground in some cases meant that specific standing actors were difficult to identify, because both sides of the debate were evenly represented or because the debating actors were the topic of discussion and the defined problem. The frame was again further divided into three secondary frames according to their special elements occurring in the texts. The articles in the three secondary frames did not share a single implication or understanding of carbon sinks. Rather, as a middle ground frame, they handled the concept from multiple perspectives, thus the name ‘Complex carbon sinks’.

(3A) 'Innovations’ frame could be seen as a counterpart to the 'Forestry as the solution' (1C) frame that did not see forestry as the problem but as the solution to mitigate climate change. Like its counterpart, Frame 3A lacked actors as clear enemies. Rather than seeing forestry as the grand solution, this frame promoted

single innovations or other forest policy shifting decisions as the solutions to mitigate climate change (*Table 4a)*.

If policy action was suggested, it was something other than increasing or restricting cuttings (*Table 4b)*. These policy actions included, for example, wind, solar, and nuclear power, or an expression of need for innovation incentives. The innovations promoted were either technological, silvicultural, or market-based solutions and were often brought up by actors from research institutions or forestry and business representatives. Biocoal, wood ash fertilizers, carbon markets, and forestation of desert land in Africa were examples of single innovations. Moreover, uneven-aged forest management was also presented as a business opportunity rather than as a restrictive policy to forest industry. Moral argumentation to promote the innovations and suggested solutions were often linked with economic aspects such as: the fact that the solutions were market-based, or that instead of raising costs, the solutions could bring income to businesses, forest owners, and Finland. Finnish forest expertise was found to be an asset when promoting the solutions. Suggestions to restrict or increase cuttings seemed to be avoided, but different solutions were promoted via criticism of bioeconomy and suggesting the allocation of restrictive forest policies to countries other than Finland.

Actors standing out (*Table 4c)* in the frame differed from actors in frames with deeper policy linkages, as actors such as the Technical Research Centre of Finland (VTT) and a consultant company Pöyry stood out in Frame 3A. Both the Greens and the Centre party were present in the articles but as relatively neutral actor groups. Research institutions and universities were yet again present in the articles, but with clearly less significant standing. It was no surprise that this frame included the most business representatives and companies as standing actors.

A common feature of the articles in the (3B) 'Discussion' frame was the definition of the polarized discussion as the main problem to be solved in order to reach the best results in sustainable forestry and climate change politics (*Table 4a)*. Most articles identified in this frame were published in 2019. Listening to and understanding both sides of the discussion was the unifying policy proposal of the frame, but single policy solutions were also brought up. The suggested solutions lacked an emphasis on increasing or restricting cuttings, but included instead monetary incentives, the continuation of forest policy decisions to improve the predictability of policy actions, and evidence-based policymaking, to name a few.

In the articles of Frame 3B, there was a slight emphasis on policies both promoting forestry solutions and stressing the importance of attaining climate policy targets. But, the main proposed solution, to reach a better outcome for the whole, was to reach a consensus on optimal forest policy and soften the

polarization in the discussion culture (*Table 4b)*. Reaching a consensus was acknowledged to require compromises from both ends of the discussion.

Because polarization was a key topic of discussion, actors from political parties to debating scientists were brought up. Specific individuals as standing actors were harder to identify, but it was evident that there was a significant share of columns and editorials in all the different newspapers (*Table 4c)*.

(3C) 'Neutral science & politics' frame included mostly articles from actors representing research institutions or universities presenting their research findings, in addition to some policy-analyzing articles. Naming the frame 'neutral' might sound problematic when categorizing sensitive policy-linked discussions, but I differentiated the frame from the others to highlight the lower policy-linkage of one group of news articles (*Table 4a)*.

The 'neutral science' articles presented both the carbon sink-increasing features of a growing tree and acknowledged the effect of increased cuttings on carbon sink levels in the short and long run. Rather than suggesting certain policy actions as superior to others, the articles' main purpose seemed to be to inform. Researchers that suggested policy actions stood out, too, but with no clear enemies as opposing actors. These articles based their argumentation on specific research findings. For example, researchers stressed the importance of tropical forest conservation or the need for a systematic transition towards a carbon-neutral society as more important than policy decisions restricting or increasing cuttings in Finland. But at the same time, researchers conveyed an implicit understanding that Finnish forest policy decisions matter, to some extent at least. The 'neutral politics' articles, in turn, had naturally a certain perspective on politics, but were relatively neutral in terms of not taking sides when assessing the policy conflicts. Articles that brought up clashing research methodologies were also identified in this frame. These articles were both analyses of the occurring situation or articles that gave standing to both ends in a relatively neutral manner. (*Tables 4b and 4c)*

4.4. Perceptions in quantitative terms

The main focus of the analysis was in assessing the qualitative aspects of the news articles, but the analysis process led into some quantitative perceptions of the data, too. Tables 4d and 4e present the prevalence of each dominant frame according to their representation by newspaper and by year. The quantitative analysis includes only the dominant frames, because distinguishing each article under only one secondary frame was difficult in some cases.

Newspaper	HS	MT	KL	KSML	Total
1. Growing forests, stronger carbon sinks	10 (27%)	24 (65%)	7 (41%)	9 (53%)	50 (46%)
2. Increasing cuttings, weaker carbon sinks	16 (43%)	4 (11%)	3 (18%)	3 (18%)	26 (24%)
3. Complex carbon sinks	11 (30%)	9 (24%)	7 (41%)	5 (29%)	32 (30%)
Total articles analyzed (by newspaper)	37	37	17	17	108

Table 4d. Frame representation by newspaper (%: frame prevalence in particular newspaper)

Year	2016	2017	2018	2019	Total
1. Growing forests, stronger carbon sinks	9 (64%)	18 (69%)	9 (35%)	14 (33%)	50
2. Increasing cuttings, weaker carbon sinks	3 (22%)	5 (19%)	8 (30%)	10 (24%)	26
3. Complex carbon sinks	2 (14%)	3 (12%)	9 (35%)	18 (43%)	32
Total articles analyzed (by year)	14	26	26	42	108

Table 4e. Frame representation by year (%: articles in frame of all articles in particular year)

A conflicting setting describes a majority of the carbon sink discussions (*Table 4d)*, but the middle ground voices proposing a more peaceful tone in the discussion cannot be ignored. About 70% of the data represented Frames 1 and 2 with a more conflicting setting, although Frame 1 included also secondary frame (1C) 'Forestry as the solution'. Thus, about a third of the articles in total ignored the conflicting setting (frames (3) 'Complex carbon sinks' + (1C) 'Forestry as the solution'). All in all, Frame 1 was the most common frame of all in the four years' time scope. HS was the only newspaper with Frame 2 as the most common.

Interesting perceptions about frame representation across the studied years (*Table 4e)* were the decrease of Frame 1 from 2016 to 2019, while Frame 3 gained more prevalence year by year being the most common frame in the most recent year analyzed, 2019.

5. Discussion

Single frames and their news articles' contents are of course important topics of interest, but a further discussion of the potential meanings behind the relationships between frames can help to contextualize the carbon sink discussions and speculate about the framings implications on carbon sink discourse and politics, as well as their future. Carbon sink discussions in 2016–2019 could be partly described as having the chronic features that were used to describe Finnish forestry discussions in the introduction to the thesis. It would, though, be naive to say that the discussion is simply polarized because a trend of harmonizing the discussion atmosphere seems to be on the rise. The changes in the frame representations in different newspapers during different years show that the carbon sink discourse and understanding of the term continues to evolve.

5.1. Contextualizing carbon sink discussions

Strengthening forests as carbon sinks has been identified as a key factor in climate change mitigation, but it is hard to neglect the importance of decarbonizing society, for which the forest industry provides a solution. The frames that promote restricting policies do not ignore the importance of decarbonization, but their proposed action to progress towards carbon neutrality bases more on following policy targets that were set nationally and internationally. Both ends of the carbon sink discussions claim, in their own way, that their suggested actions are the best solution to mitigate climate change. As these suggested actions are argued alongside certain emphasis of carbon sinks, it is evident that carbon sink framings are used to promote different policy agendas.

The tones and the detailed topics of the discussions vary in the four years' time scope of the analysis, but the deepest recurring issue in the carbon sink conflicts' roots seems to be whether or not optimal carbon sink policies restrict the material use of forests. The debates often focus on adjusting yearly cutting amounts or arguments about the relationship between national and international power relations to decide what the optimal carbon sink levels are. Noticeable throughout the data is that mitigating climate change is seen as a general, shared policy interest, or at least it is not neglected in any of the frames by any actor. Climate change mitigation in the Finnish public discussion is often linked to reaching carbon neutrality, and the identified frames signal that disagreements will be raised by the different ways of progressing towards carbon neutrality through adjustments to forest policies.

Between the debating on simply increasing or decreasing forest cuttings, a major share of the discussion involves the end-use of forest products—for example, when debating the use of forests for bioenergy production. The criticizers of increasing cuttings often support their views by referencing scientific research

over sustainability issues and the biodiversity-decreasing effects of increased bioenergy use. The supporters of increasing cuttings, in turn, bring up the sustainability issues of restricting forest policies in Finland, as they would only lead to increased cuttings elsewhere (carbon leakage). Other recurring topics in the discussions include the potential increased use of wood as a construction material, which is promoted by both the forestry proponing frames (1A, B, C) and the climate and environment (2A, B) frames. Promoting wood construction or, at least, not criticizing it, is thus another example of a shared feature among all the frames, alongside acceptance of the existence of climate change.

Another noticeable (or rather, unnoticeable) perception in the data was that how few articles focused on the issues of decreasing biodiversity, when discussing forest politics. This may be due to the analysis focused on articles that include particularly carbon sinks to some extent as the discussed topic, which, in turn, might lead into the discussion's focus also being more in climate change than biodiversity conservation policies. If the discussion of forests more as an object of climate change policy leads into neglecting the forests role as reservoirs for biodiversity, it can be speculated, whether a change in the discourse would lead into changes in how forest policies are made.

The forestry promoting frames often argue that the restricting policy actions require even more readjustment from rural Finland, which is already seen as a suffering part of society. Also, the forestry frames promote Finnish authority over EU legislation to define the right models to calculate the official national carbon sink levels, i.e., to have more power to decide on its forest policy. International, restricting rules are seen as harmful for Finnish forestry, but the markets are seen as a force of nature. At the same time, these Finnish forestry restricting policies are seen as harmful for climate change mitigation, too, because of carbon leakage. The climate and environment frames (2A, B), in turn, do not criticize the possible internationally set legislation and targets, but rather take them as forces of nature.

5.2. Policy implications

The international cooperation in EU climate policy is based on the target of achieving the goals of the Paris Agreement, that seeks to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius (EU Commission, 2020; UNFCCC, 2015). Moreover, the Paris Agreement highlights the importance of fast action from countries if the goals are to be achieved. A logical implication could be made that the climate and environment frames see climate change mitigation more as a global effort and have thus more respect on abiding international rules and restrictions. Vice versa, does this imply that the forestry promoting frames see that Finland as a

country, or forestry as an industrial sector, should not take the premise of Paris Agreement and its urgency seriously?

Of the discussions' conflicting ends, it is more often the forestry criticizing actor groups that promote a need more evidence-based policy and, for example, a need for restricting yearly cutting amounts. A common argument often heard from the forestry criticizing end of the discussion also seems to be that 'there is a consensus in the academia about problems x and y, why action z should be avoided'. However, on the basis of the analyzed media material it does not seem that there is a consensus in the academia, because both the conflicting ends of the discussion use varying scientific references to promote their suggested actions. It is yet notable that the forestry promoting actor groups have a smaller scope of different scientists in support of their views, and instead of scientists, their arguments are promoted more often by interest group representatives or other societal actors, of which the representation of writers of editorials and columns is high. This can partly imply forestry restricting policies being seen as a social problem rather than environmental.

If media is seen as an actor also building the reality through societal practices, the media can thus have an effect on either creating or weakening the polarization of discussion. Considering the media as a strong societal actor, it is notable that a majority of the discussion is in a conflicting setting on the basis of the analyzed material. On the basis of the frame representation by the studied years and newspapers (*Tables 4d and 4e)*, a division between Helsingin Sanomat and the other three newspapers can be drawn: the city newspaper allowed altogether more space for the climate and environment Frame 2, while Frame 1 promoting forest industry's interests was most commonly represented in the other newspapers. If the four newspapers are examined as a representation of the whole newspaper media, though, the trend of 2016–2019 was that Frame (3) 'Complex carbon sinks' was on the rise and the most common frame in the most recent studied year, 2019. In other words, differences between newspapers and their representations of frames are evident in the data, but the discussion has developed more into the direction of understanding carbon sinks in a more complex way. That is also why I would not make a conclusion that the Finnish media attempts to create polarization. Polarization does yet exist to some extent, because different newspapers allow more space for certain frames, and thus for certain policy agendas, too.

In the analytical framework, I brought up the term *mediatization of politics*, which describes a situation when actor groups produce events only to get published and thus gain publicity. In the context of Finnish forestry discussion, this kind of a mediatization could be present when the conflicting ends purposely debate forestry issues as perhaps larger issues than how the reality behind the disagreements is. On the other hand, the suggested policy actions from both ends of the discussion differ significantly, which

probably explains the conflict. In other words, if others see forestry as the solution and others forestry as a problem in climate change mitigation, it is not difficult to imagine a real conflict of opinions on forest and climate change politics. Luckily the discussions are more diverse, but it cannot be ignored that such debates with simplistic views are true, too.

One possible reason behind the varying carbon sink emphases in the Finnish public discussion is that the different popular definitions of the term also vary in terms of their emphasis. The IPCC's (2000, p. 598) special report on emissions scenarios defined carbon sinks as “natural or man-made systems that absorb CO2 from the atmosphere and store them. Trees, plants, and the oceans all absorb CO2 and, therefore, are carbon sinks”. More recently, in the glossary of IPCC (2018, p. 558) special report's carbon sinks are defined more comprehensively by addressing a further notion*: “A reservoir (natural or human, in soil, ocean, and plants) where a greenhouse gas, an aerosol or a precursor of a greenhouse gas is stored. Note(*) that UNFCCC Article 1.8 refers to a sink as any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere”.

The Finnish Climate Change Panel (2017, p. 17), in turn, an important actor in the Finnish forestry discussion context, defines carbon sinks as "an increase in the carbon stock of a forest” / “a positive change in the carbon balance counted in a certain time scope” (translated from the original Finnish article). The emphasis of the Panel's and the IPCC's definition vary in terms of the other one stresses the carbon absorbing feature of trees (*the IPCC reports)* an the other one stresses the change in the total carbon stock (*Finnish Climate Change Panel*). In other words, two crucially different features that affect optimal carbon sink policies are included in the debate: the change in the size of the stock or the change of the growth of the stock. Another issue that might cause definitional uncertainty, in addition to specifying which definition of carbon sinks is used, is that a clear specification of close terms to carbon sink (such as carbon stock, carbon pool and carbon flux) often lacks in the public discussion. This is the case at least in the Finnish discussion.

It seems evident that carbon sink as a scientific term transforms into varying forms that can be used in promoting altering policy agendas because of definitional uncertainty. A lot of the term's flexibility probably lies also behind the often-occurring topic in the data, which is the uncertainty behind methods for calculating carbon sink levels. This methodological uncertainty itself was used as a supporting argument in favor of both forestry restricting and promoting policy goals. For example, actors may argue that because there is methodological uncertainty, more cuttings should not be made to ensure that climate change is mitigated fast enough. Vice versa, there are arguments that say the number of cuttings should not be restricted because of the uncertainty, as carbon sinks and forests will grow back in time anyway.

If some arguments imply that nothing can be said because carbon sink calculation models do not reflect reality and the restrictions are all about the politics of calculation, a question could be asked: what should be done with the models, then? It is currently not possible to perfectly describe the reality of carbon sink levels with mathematical models, but if evidence-based policymaking is wanted to be realized, trusting the majority of scientific research is probably the right way. An alternative is to base policy on the interest of a single country, industry, or a company.

I shall end the discussion of the policy implications of the framings with an open speculation of whether these observations from the material could forecast possible future topics of forestry discussions in the media, politics and the academia. As most of the data's articles represented a frame with a conflicting setting, I would still describe the carbon sink discussions with the features of the traditional Finnish forestry debates to some extent. Yet, the raising voices for a more peaceful discourse especially in 2019 can be a sign of less simplistic carbon sink debates in the future, too. On the other hand, The EU Green Deal promoted by the Commission might lead to a revision of the EU forest strategy (EU Commission, 2019b), why it might be only naive to suppose that the conflicting ends of the discussion will stay silent when carbon sink policies are back on the decision table. If the conflicts rise yet again in the future discussions, it is interesting to see whether this thesis' proposed frames will occur as they did in 2016–2019. There is also a possibility that the discussion participants have learned that they have only been debating carbon sink issues in a different language. The more the discussion participants adopt a same language, the more the actual policy agendas will stick out from the discourse.

5.2 Actor groups

Possible signals of the different actors' presentations in the media could be further examined, too. What is definitely interesting and perhaps alerting in this thesis' results, is that a frame division based on specific understandings of a natural scientific concept goes relatively well in line with a predictable division of actor groups promoting and opposing certain policy suggestions. As an example, Centre Party politicians tend to emphasize the carbon absorbing features of a growing tree while promoting the importance of conventional forest management practices. In a similar way, the Greens stress the outcome of increasing forest cuttings: shrinking carbon sinks. Both of the arguments are true from different viewpoints and opposite policy actions can be suggested accordingly. This leads into a situation that agreeing upon optimal carbon sink policies seems rather like a debate around a question of belief. Some believe more in certain biological features of carbon sinks than in others.

Of political parties, the Greens and the Centre party were most evidently presented in a conflicting setting. This conflict was especially strong when the Centre Party was the government's leading party and the Greens stood in the opposition (2015–2019). Juha Sipilä's led government was often described with a strong policy emphasis on bioeconomy, which was actively brought up in the news articles both from the government's and the opposition's points of views. The most recent government formation from spring 2019 on (first led by Antti Rinne, later replaced by Sanna Marin, both from Social Democrats) include both the Greens and the Centre party. It could be speculated whether the voices that promote a less polarized discussion atmosphere (identified in frame (3) 'Complex carbon sinks') are partly results of a season with a government that includes two parties with strongly altering views over optimal climate change policy. Most of the current government's internal conflicts around environmental issues have thus far focused on ending Finnish peat production, but forest policy and cutting amounts have also been a discussion topic, although a minor one.

Representatives of the current leading party in the government, Social Democrats, were not once analyzed as standing actors in the frames. This might be a signal of the party's will to maintain the current government formation despite the other parties' conflicting interests. Alongside the ambitious carbon neutrality target by 2035, the 2020 government has set a target for improving Finnish employment rates, which might be one factor behind the government not having taken strong stances on shifting current forest policies.

Of other parties than the Social Democrats, the Greens and the Centre party, actors present in the carbon sink discussions were mostly single MEPs. These other parties seemed to be divided in the middle of the EU Lulucf debates or did not signal of strong views on forest matters. A deeper analysis of the political parties would require more background than only single events brought up during the last two governmental seasons, and that is why I leave a more thorough forest policy analysis of political parties to the interest of other research.

Other actors than politicians standing out in the discussion include all other actor groups brought up earlier in the thesis. The presence of interest groups and NGOs goes well in line with the presence of the Centre Party (linked to interest groups) and the Greens (linked to NGOs) in the frames. Scientists standing out in the discussion vary between the dominant frames especially, and different policy actions are suggested with support of the findings of different scientists. What is perhaps interesting in the results is that scientists themselves do not criticize other scientists often in the media discussion. Single critiques towards methodologies or conclusions of certain research are marginally present in the discussions, but mostly it is the clashing views of politicians and not the clashing scientific views that are given the most attention.

Perhaps the loudly expressed wish for a less polarized discussion culture present in frame (3) 'Complex carbon sinks' springs from the public discussion that does not provide the public with enough scientific, but political debates. A scientific consensus of the effects of forest policies on carbon sink levels should be reached by scientists and not the media, politicians or interest groups and NGOs, yet they all surely have their own important roles to play in the big picture.

The raising concern for a need to reach towards less polarized forest discussions was promoted especially by other actors than politicians, scientists or interest groups and NGOs. These concerns were present in frame (3) 'Complex carbon sinks', especially in columns, editorial texts and opinion pieces written by citizens in all the four studied newspapers. In comparison, the frames with a conflicting setting (1 and 2) included editorials and columns only in certain newspapers, but not all of the four. What this might signal of, is a need of bringing the conversation more on the level which a non-forestry expert could understand. On the other hand, presenting the discussion in a too simplistic manner might leave space for relatively simplistic debates as well.

5.3 Limitations

I shall end this section by addressing the possible limitations of the thesis. Linström and Marais (2012, p. 27) list further problems linking to frame analysis as a methodology, two of which are reliability and validity. The validity of a qualitative frame analysis confronts a threat in regard to how the frames are operationally identified. D'Angelo and Kuypers (2010, p. 46) argue that researchers tend to "reinvent the wheel" when identifying frames from the data. The identification of frames surely required subjective inference of the data and many of the results may not strike as surprising. I yet believe that the building of frames around carbon sinks open new perspectives on studying forest discussions.

Moreover, the data collection, analysis, and presenting the results in a frame analysis also encounter challenges. Klandermans and Staggenborg (2002, p. 62) bring up the indistinct relations between different frames, which was unarguably a key challenge in the analysis process as some of the news articles could have been identified to represent multiple secondary frames. Klandermans and Staggenborg also argue that the process of describing and presenting evidence for verification and proof needed to identify frames may be difficult. As the large set of textual data in the case of this thesis' data would be heavy to unload in the analysis, a list of news articles included (and also manually excluded) in the material analysis is provided after the list of references.

I would also note the possible limiting factors rooting from my research aims and objectives. Although the chosen research question and setting of the thesis were results of long considerations and sacrifices, the aim of the research could have been even narrower. I get to contextualize the carbon sink media discussions via the frame analysis, but I have a doubt whether the analysis of the discussions' policy and actor linkages are left with too small focus. It has to be yet kept in mind that the frame division is drawn from a limited media discussion. That is why straight conclusions to the real world about the political or scientific discussions around carbon sinks should not be made but assume that these discussions describe the reality to some extent.

When it comes to the limitations of collecting the data, the number of 108 articles chosen for the analysis could have always been bigger. I made a division between the major (HS & MT) and minor (KL & KSML) newspaper medias which was seen in the sample sizes of news articles collected from each newspaper. Considering what the conceptualization of a broad discussion theme can provide, perhaps the sample sizes of all the four newspapers could have been equal. Moreover, many other possible newspapers could have been used in collecting the material: Yle, Aamulehti, Lapin Kansa, Ilta-Sanomat, to name a few. With these and probably multiple other possible limitations of this thesis acknowledged, I strongly believe that the thesis' results and their discussion provide worthy insights for anyone who has to familiarize themselves with carbon sink involving forest and climate change discussions.

6. Conclusions

Carbon sink as a scientific term has increasingly occurred in forestry and climate change discourse, including the public media discussion. This study attempted to discover how the term is used to promote different policy agendas by different actor groups and, in addition, to contextualize the carbon sink discussions of 2016–2019. The frame analysis of a media material verified the existence of multiple varying ways of using the term. The different ways of framing carbon sink issues vary in the manner in which they emphasize different features of the term. These emphases, in turn, can be linked to supporting altering policy agendas and actions with certain kind of argumentation, demonstrated through the identification of different frames.

Clear disagreements between the promoters of different policy agendas are linked to the different understandings of or emphases on the features of carbon sinks. The forestry proponing actor groups stress the carbon sink absorbing features of a growing forest or a tree. The climate policy target proponing actors, in turn, stress the importance of increasing carbon sink levels due to national and international climate policy targets and biodiversity conservation, in addition to linking forest cuttings to shrinking carbon sinks. Disagreements arise due to calculative and definitional uncertainties, balancing between forest industry interests, and Finland abiding by its climate policy targets. The role of forest industry and carbon sinks in the national target of reaching carbon neutrality is a key debated issue.

Scientific evidence to support policy agendas in the carbon on sink discussions is used in all the varying ways to communicate issues around the concept. Although the climate policy target proponing actors in particular argue their policy agendas based on a 'consensus within the academia', the media discussion does not imply such a consensus. Conflicts around optimal carbon sink policies continue to occur and develop according to topical matters, but voices that promote a more peaceful discussion atmosphere and consensus-building as priority optimal carbon sink policies, are on the rise.

The main policy implication of this thesis is that carbon sinks should be more accurately defined when debating the optimal kind of forest policy. The popular definitions of carbon sinks, from the IPCC and Finnish Climate Change Panel, for example, vary in terms of whether an increase of carbon sink level means a change in the carbon stock or a change in the growth of carbon stock. That is why it is recommended to clearly specify which particular definition of carbon sink is being used when discussing carbon sink involving politics. When entering a detailed debate over optimal carbon sink policies, terms other than carbon sink might also be considered and used instead. These include: carbon stock, carbon pool, or carbon flux.

I shall end the thesis by identifying further research topics to study the communication, politics, and the scientific disagreements over carbon sinks according to thoughts that arose during the writing process. Frame analysis on a limited media material may reveal many interesting aspects about discourses, actors, and what the media's role is like in the carbon sink politics. A frame analysis could also be conducted on official national or EU level documents that steer climate politics around the topics of forestry, agriculture, and land-use. Such research, with an additional emphasis on theories of evidence-based policymaking, could reveal how the different framings are linked to the science-policy interface of forest and land-use politics.

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Index I – List of media articles used as the material of analysis

Maaseudun Tulevaisuus

20.12.2019 Metsäteollisuus arvostelee: EU:n ilmastopolitiikka kohtelee Suomea epäreilusti – Ruotsissa nielutavoite saavutetaan selvästi suuremmilla hakkuumäärillä
15.11.2019 Nykymenolla metsien hiilinielu notkahtaa vain hetkellisesti – vuodesta 2035 kokonaisnielu kasvaa vaikka hakkuita lisättäisiin, jos maatalouden päästöt vähenevät
24.10.2019 Petri Sarvamaa valittiin EU-parlamentin pääneuvottelijaksi unionin tulevalle metsästrategialle – "Metsiä ei voi kohdella pelkästään hiilinieluina"
26.8.2019 Kansantalous kuntoon ja metsäpalot kuriin
1.7.2019 Ikioma hiilinielu
5.6.2019 Hiilinielukeskustelu polarisoitui – jälleen
15.5.2019 Ilmasto- ja ympäristö- ahdistus uhkaa maaseutua
3.4.2019 Nyt on varaa
25.3.2019 Antti Rinteen metsityssuunnitelmat saavat tukea MTK:lta – metsähankkeiden rahoitusta lisättävä kymmenillä miljoonilla euroilla
8.3.2019 Metsädraama johti tuloksiin
4.3.2019 Pohjoiset metsät ovat poikkeus EU:ssa
27.2.2019 Lopullinen totuus metsien hiilinieluista
15.2.2019 Paperiliiton Vanhala ihmettelee hakkuiden rajoittajien sinisilmäisyyttä – puu hakataan varmasti jossakin päin maapalloa
1.2.2019 Puun hinnoittelu ja hiilinielu
17.12.2018 Miten pelastan maailmaa?
12.12.2018 Suomi esittää EU:lle metsien hiilinielujen vertailutasoksi 34,77 miljoonaa hiilidioksiditonnia vuodessa
3.12.2018 Metsien hyvä hoito palkitsee
19.11.2018 Greenpeace vaatii puoluejohtajilta sitoutumista lokakuun ilmastomarssin vaatimuksiin – metsien hakkuita ei saisi enää lisätä
7.11.2018 Ilmasto hyötyy Suomen metsien nykyisestä käytöstä
29.10.2018 Metsäkeskustelu tervehtymässä
12.10.2018 Ilmastonmuutos kuuluu politiikan keskiöön
31.8.2018 Pääministeri Sipilä: Auton tankkauksella pitäisi pystyä rahoittamaan metsän istutusta
20.4.2018 Ympäristöprofessorin mielestä pitkäikäisiä puutuotteita ylikorostetaan: "Kaikesta puusta ei saa kiinalaisille sänkyjä"
18.12.2017 Biotaloudessa katse kohti tulevaisuutta
15.11.2017 Miten käytämme metsiämme?
4.10.2017 Tutkimus: Varhainen lumen sulaminen lisää hiilidioksidin sitoutumista metsiin
13.9.2017 Suomalaiset mepit tuulettavat hiilinielupäätöstä: "Tämä on suuri helpotus"
1.9.2017 Ilmastomuutos vaatii kylmää päätä
21.7.2017 Biotalous tarvitsee suomalaisten tuen
21.6.2017 Kimmo Tiilikainen iloissaan lahopuusta – "Metsien monimuotoisuus kasvaa"

31.3.2017 Professoriparivaljakko: Suurin ilmastohyöty syntyy talousmetsien käytöstä

22.2.2017 Turha huutokauppa ilmastopolitiikasta

21.12.2016 Olmme tienhaarassa

9.11.2016 Anttila perää Niinistöä vastuuseen Durbanin metsäsopimuksesta

5.10.2016 Suomen metsien hiilinielusta uhkaa tulla päästö

6.9.2016 Metsäteollisuuden blogi: "EU:n ilmastopaketti tarjoaa Suomelle litsarin avokämmenellä"

28.4.2016 Koituuko puuenergiasta päästö vai säästö? Tutkijat eri mieltä hakkuiden hiilinieluista

Helsingin Sanomat

30.12.2019 Suomen metsäpolitiikkaa on muutettava radikaalisti

29.11.2019 Maapallon ilmasto uhkaa ajautua peruuttamattomaan pisteeseen, varoittaa joukko tutkijoita

31.10.2019 Metsäpolitiikan ristiriitaisten tavoitteiden yhdistäminen vaatii sovittelua ja jatkuvuutta

19.9.2019 HS-analyysi: Hallitus aikoo kammeta Suomen hiilineutraaliksi 15 vuodessa, budjettiriihen jälkeen edes vihreiden Ohisalo ei kehdannut hehkuttaa ilmastopäätöksiä

20.8.2019 Valtion metsiä uudistetaan vastuullisesti

7.8.2019 Kommentti: Miten ihmeessä Suomen riitaisa hallitus aikoo vastata ilmastoraportin vaatimuksiin?

13.6.2019 Ilmastonmuutos on maailmansodan veroinen uhka, jonka Suomi voi ratkaista, kirjoittaa Risto Isomäki uudessa kirjassaan

24.5.2019 Uudet europarlamentaarikot ovat paljon vartijoina

8.5.2019 Ylä-Lapin metsät tulisi jättää puuntuotannon ulkopuolelle

28.4.2019 Suunnitelma sellutehtaasta ajoi vihreät ahtaaseen rakoon – Miten mennä hallitukseen nolaamatta itseä ja suututtamatta kannattajia?

1.4.2019 Metsänhakkuut pitää suunnata sinne, missä niistä on vähiten haittaa

18.3.2019 Hiilinielu voi kasvaa myös aavikolle

28.2.2019 Voiko Suomi yltää nollapäästöihin lähivuosikymmeninä? Selvityksen mukaan se vaatisi tuntuvia päästövähennyksiä ja ydinvoiman tuotannon lisäämistä

23.1.2019 Tuhka vauhdittamaan metsien kasvua

26.12.2018 Metsä palasi Suomessa poliittisen keskustelun ytimeen

12.12.2018 Uusi laskelma arvioi metsien hiilinielun aikaisempaa suuremmaksi – Luonnonsuojeluliitto kritisoi lukuja voimakkaasti: ”Tässä mennään biotalous eikä ilmasto edellä”

21.11.2018 Suomi esitti ratkaisuehdotuksen siihen, miten EU-rahalla kannattaisi torjua ilmastonmuutosta: Istutetaan metsää Afrikkaan

12.11.2018 Lajien kirjo maailmassa vähenee, mutta Suomella on hieno esimerkki siitä, miten uhanalaisen eläimen pelastaminen onnistuu

27.10.2018 Tutkimusta voi tilata mutta ei sen tuloksia

14.10.2018 Ilmasto ei kestä hakkuiden kasvattamista

8.10.2018 Ilmastopaneelin puheenjohtaja tyrmää Suomen innon puusta valmistettuihin polttoaineisiin: ”Ne ovat neljä kertaa kuormittavampia kuin fossiiliset polttoaineet”

25.7.2018 Jopa Hesburgerissa tarjotaan hiilijalanjäljen hyvitystä – Mutta auttaako maksu todella ilmastoa?

17.2.2018 Fossiilisen kivihiilen käyttö on lopetettava

17.12.2017 Päästöjä syynättäessä kokonaiskuva pääsi unohtumaan

22.11.2017 Ilmastonmuutoksen hillintä on parasta elinkeinopolitiikkaa

13.10.2017 EU-maat hyväksyivät joustot hiilinieluihin Suomen tahdon vastaisesti – Ministeri Tiilikainen: ”Ei tähän voi tyytyväinen olla”

22.9.2017 Suomen eliitti lähti vuosi sitten ”talvisodan hengessä” ajamaan yhtä asiaa Brysselissä – näin EU:n metsäpäätös lobattiin teollisuudelle sopivaksi

26.8.2017 Sipilä haki Ruotsin pääministeri Löfveniltä tukea Suomen metsäpolitiikalle

12.7.2017 Toivottavasti EU:n ympäristövaliokunnan kanta voittaa

4.7.2017 Jääkö Suomi päästöpolitiikassaan yksin? Biopolttoaineisiin panostaminen on lähes 20 vuoden riski

23.5.2017 Ilmastopaneeli: Hallituksen kaavailemat metsien lisähakkuut kasvattaisivat päästöjä

26.3.2017 Tutkijat varoittivat hallituksen biotalousinnon kiihdyttävän ilmastonmuutosta – Ministeri Tiilikainen kiistää kritiikin

10.12.2016 Bioenergialle tarvitaan uskottavat kestävyyskriteerit

19.11.2016 Sirkka-Liisa Anttila syyttää: Jyrki Katainen ja Ville Niinistö tekivät Suomen metsistä päästölähteitä – epäonnistuivat Suomen etujen valvonnassa

31.10.2016 Hiilinieluja ei voi käyttää miten tahansa

23.7.2016 Riman alentaminen ja populismi eivät ratkaise ilmasto-ongelmaa

22.4.2016 Suomen ilmastotavoitteet tarvitsevat päivitystä

Kauppalehti

17.12.2019 Suomen esitys hiilinielujen vertailutasoksi muuttui - metsien hiilinielutavoite pienenee

22.11.2019 Selluhankkeita turha kytkeä hiilinieluihin

30.10.2019 Metsänomistajat voivat saada tilaisuuden tehdä helppoa rahaa hiilinielun ylläpitämisestä

26.6.2019 Ministeri: Kaikki selluhankkeet eivät voi toteutua

29.5.2019 Nyt soita ostamaan – Pohjois-Suomesta saa halvalla

11.4.2019 Lukelta uutta tietoa: Metsien hiilinielut kasvavat oikeilla metsänhoitotavoilla

11.2.2019 Ilmastotavoitteiden kannalta ajalla on väliä

13.12.2018 Suomen metsien hiilinielu pienenee 2021–2035

10.12.2018 Juha Sipilä: Suomi haluaa hiilipörssin jokaisen suomalaisen käyttöön - ”Miljardin euron tilaisuus”

1.11.2018 Metsähakkuissa menetetty hiilinielu voidaan ehkä korvata biohiilellä – VTT: Suomi saisi kilpailuetua

21.6.2018 Ilmastopaneeli vaatii Suomelta kunnianhimoisempaa ilmastopolitiikkaa – päästöjä vähennettävä yli 85 prosentilla vuoteen 2050 mennessä

15.12.2017 Suomelle osavoitto metsäsodassa – uusi laskenta edessä

15.11.2017 Hiilinielu pysyy auki metsänhoitotöillä

14.7.2017 Mepit saavat hiilinielut näyttämään päästöiltä

6.3.2017 Suomen metsäsota
hiilinieluista jatkuu EU:ssa

24.11.2016 EU:lta pian tuomio - Suomen metsistä hiilinielun sijaan päästö? US: Asia pääministeritasolle

11.5.2016 Hoidettu metsä - paras hiilinielu

Keskisuomalainen

16.12.2019 Metsien hiilinielun vertailutasoa tarkistettiin selvästi pienemmäksi – myös hakkuukertymää tarkistettiin alaspäin

18.9.2019 Metsänomistajan puukauppatuloista voi kadota jopa neljännes

21.8.2019 Outoa touhua Jyväskylän metsissä

4.5.2019 Ensimmäisen kerran sitten 70-luvun Suomessa hätyytellään kestävän metsänhakkuun ylärajaa – Keski-Suomessa rajat jo paukkuvat

6.4.2019 Puu on kestävä hiilinielu

16.3.2019 Tutkijat: Näillä viidellä keinolla ilmastonmuutos pysäytetään – katse käännettävä metsiin ja soihin

19.2.2019 Tärkeään metsä- kysymykseen ei ole yhtä vastausta

30.12.2018 Ilmastopolitiikassa on toimittava nyt

17.11.2018 Kotimainen puu ei riitä kaikkiin suunniteltuihin investointeihin – vain joka kymmenes suomalainen lisäisi hakkuita

7.11.2018 Kolumni: Ilmastonmuutosta kuriin tuhkalannoituksella

19.10.2018 Vihreät haluaa Suomesta hiilineutraalin vuoteen 2030 mennessä – metsänomistajille maksettava puiden kasvamisesta

15.12.2017 Tutkimustulokset ja metsätalous

12.10.2017 Hiilinielu-taistossa jälleen ratkaiseva päivä

19.9.2017 Kädenväännössä hiilinieluista ensimmäinen erä Suomelle

11.9.2017 EU:n metsäkiistassa sorvataan kompromissia – lobbaus jatkuu keskiviikon äänestykseen saakka

20.11.2016 Kestävää metsätaloutta Eurooppaan

20.7.2016 Komissio linjasi Suomelle kolmanneksi suurimmat päästövähennykset

Index II – List of media articles manually excluded from the material

Maaseudun Tulevaisuus

6.4.2019 Tutkijat epäilevät täydennyskylvön hyötyjä – tiloilla sen on havaittu varmistavan sadon määrää ja laatua

-Topic: Agriculture, not forestry

27.2.2019 Luken tutkija: Naudanlihan ympäristöhaitat on yliarvioitu – "Kaksi hiilivoimalaa tuottaa saman ilmastokuorman kuin on kaikkien Suomen nautojen metaanipäästö"

- Topic: Agriculture, not forestry

3.9.2017 Uhkaako EU Suomen metsätaloutta? Katso video MTK:n keskustelutilaisuudessa

- Video article

2.4.2017 Harhaanjohtavia väitteitä naudanlihan tuotannosta

- Topic: Agriculture, not forestry

Helsingin Sanomat

11.12.2019 Tutkijat löysivät Sudanista vihdoin syyn, joka selittää ilmakehän metaanin nopeaa kasvua

- Not a forestry topic, no Finnish context

2.12.2019 Raha puhuu ilmastoasioissa – ensimmäistä kertaa ilmastokokoukseen on kutsuttu myös valtiovarainministerit

-Strengthening carbon sinks only mentioned once as a large policy theme, forestry not in focus

4.11.2019 Kaksi toimittajaa surmattiin indonesialaisella palmu-öljyalueella

-An accident report of two dead reporters, not a forest policy topics

21.9.2019 Vihreiden Ohisalo bensa-verosta: Onko keski-luokalle tärkeämpää muutama euro kuussa vai se, että yhteis-kunta on kunnossa?

-Strengthening carbon sinks only mentioned once as a large policy theme, forestry not in focus

20.9.2019 Ilmastonmuutokseen on sopeuduttava nopeasti

-Strengthening carbon sinks only mentioned once as a large policy theme, forestry not in focus

19.9.2019 Kirja ehdottaa, että YK julistaisi maailmanlaajuisen ilmastohätätilan – Näin se vaikuttaisi

-Strengthening carbon sinks only mentioned once as a large policy theme, forestry not in focus

19.9.2019 HS-analyysi: Hallitus aikoo kammeta Suomen hiili-neutraaliksi 15 vuodessa, budjetti-riihen jälkeen edes vihreiden Ohisalo ei kehdannut hehkuttaa ilmasto-päätöksiä

24.8.2019 ”Amazonissa mikään ei ole sopeutunut tuleen” – sade-metsässä riehuvat maasto-palot uhkaavat myös tuhansia eläinlajeja, joille pahin uhka on ehkä vasta edessä

- Forest fire discussion (Brazil)

24.8.2019 Ministeri Lintilän lihakommentti ylitti kansainvälisen uutiskynnyksen

- Agriculture, not forestry

24.8.2019 EU:n tulee taivuttaa Brasiliaa ympäristönsuojeluun kauppapolitiikalla

- Forest fire discussion (Brazil)

23.8.2019 Ydinvoimaa pitää puolustaa ilmaston takia

-Carbon sinks mentioned, but text focuses on the pros of nuclear energy, not really forestry discussion

22.8.2019 Miksi paholaisen oma saa armon? Jussi Nikkilä pohtii Juhlaviikkojen Faust-spektaakkelissa myös nykyihmisen selviytymistä

-A theatre director's interview, carbon sinks mentioned once but not in the focus.

9.5.2019 Näin lobbarit vaikuttavat juuri nyt: ”Meiltä on usea puolue ihan pyytänyt, että lähettäkää lyhyitä tekstejä, joita voi leikata ja liimata suoraan hallitus-ohjelmaan”

- Carbon sinks mentioned once but not in the focus

9.5.2019 EU:n uudet johtajat halutaan jo kesäkuussa – Sipilä: Suomella mahdollisuuksia EKP:n johtoon, tuskin muualle

- Carbon sinks mentioned once but not in the focus

Kauppalehti

23.8.2019 Järkyttävä kuva osoittaa Amazonin palojen mittakaavan – ”Brasilialaiset tuotteet boikottiin kunnes tämä sikailu loppuu”

-Forest fire discussion (Brazil)

Keskisuomalainen

27.9.2019 Tarvitsisiko turveyhtiö Vapo parempaa omistajaohjausta?

-Forests not in focus, but peat production